

DIAGNOSIS OF ESOPHAGEAL LESIONS.¹

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Two classes of diseases of the esophagus may be distinguished—functional and anatomical. *Functional disease.*—There are two chief functional disorders of the esophagus. One is related to sensation; the other to motility.

Sensory Disorders.—The only disorder of importance relating to sensation is hyperesthesia. Hyperesthesia of the esophagus is not infrequently the cause of discomfort occurring during the act of swallowing. The discomfort may be burning or smarting in character, and is usually felt along the whole length of the esophagus, but may be referred to the epigastric region alone. There may be other manifestations of a neurosis present, such as tenderness along the spine, or hysterical stigmata elsewhere. One cannot be sure that hyperesthesia alone is present until after the passage of bougies, and, if possible, the use of the esophagoscope. In hyperesthesia of the esophagus, which usually extends throughout the whole length of the organ, as soon as a bougie passes beyond the pharynx and enters the esophagus the patient complains of great pain, which continues as the bulbous point of the bougie is pushed down the whole length of the esophagus. Hyperesthesia may be associated with slight spasm at any point in the esophagus, but real obstruction to the passage of bougies is not present. Upon passing the esophagoscope a normal mucous membrane is found. Such cases are not extremely rare. I have seen three during the last year.

Anesthesia of the esophagus may result from central lesions of the nervous system, or occur as a manifestation of a

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neurosis. No practical importance is as yet attached to the condition.

Motor Disorders.—Spasmodic contraction of the circular fibres of the esophagus may take place at any level of the tube. The so-called "globus hystericus" is due to spasm of the esophagus. Esophageal spasm is not usually followed by serious results, except when it occurs at the upper and lower ends. Esophageal spasm will be discussed with the other causes of stenosis of the esophagus.

Anatomical Disease.—Inflammation of the esophagus serious enough to be of clinical importance is not common, except when caused by the ingestion of caustic alkalies, acids, and metallic salts. Deglutition is painful and the history of the case will usually render diagnosis easy. If necessary, the esophagoscope may be used to differentiate the condition from hyperesthesia. Inflammation of the pharynx seldom extends to the esophagus. The esophagus is almost immune to diphtheria, and is rarely inflamed in measles, scarlet fever, small-pox, and typhoid fever. Tuberculosis of the esophagus is extremely rare; likewise syphilis. Actinomycosis of the esophagus has been described.

Ulcer.—Ulceration of the esophagus seldom occurs, except in association with carcinoma. There have been less than forty cases of peptic ulcer of the esophagus reported. Peptic ulcer may occur anywhere in the lower third of the esophagus. If at the very lower end, owing to the vascularity of the part, hemorrhage is likely to be a prominent symptom. Ulcer of the esophagus may be readily detected by the esophagoscope.

Esophageal Stenosis.—By far the most common and serious disorders of the esophagus are related to conditions producing obstruction to the lumen of the tube. The early diagnosis of esophageal obstruction is very important. The first symptom is usually discomfort or pain occurring during the ingestion of food. Whenever a patient complains of discomfort while eating, we should always think of the following conditions as possible causes: Disorders of the esophagus,

ulcer or carcinoma at or near the cardiac end of the stomach, perigastritis, perigastric adhesions, epigastric hernia, nervous dyspepsia, and gastritis. The discomfort or pain of esophageal stenosis is usually located at the seat of the obstruction, but may be referred to the epigastric region or to the back. As the stenosis increases, the patient may be conscious that the food is arrested at a certain point in the esophagus, and that greater time and effort are required to force the food into the stomach. The patient usually knows when the food passes the obstruction. As the lumen of the tube grows smaller, the sensation of fulness behind the sternum, due to accumulation of food above the seat of the stricture, increases. If an attempt is made to eat rapidly, a choking sensation results, and the contents of the esophagus are regurgitated. The patient frequently describes the act of regurgitation as vomiting. Whenever a patient complains of discomfort, pain or vomiting at the time of eating, we should never neglect to put him to the test, and observe what happens during the ingestion of food and drink. If stenosis has been present even for a short period, the patient has learned to eat slowly, to take small bits of food, and to reduce them by prolonged mastication. If the stenosis is considerable, even liquids are sipped slowly, and the act of swallowing is frequently repeated. That a distinct effort is required to cause the food to go down is clearly apparent. When urged to eat more rapidly, the patient usually indicates that it is impossible. Discomfort is evident; an attempt may be made to wash the food down with water. If unsuccessful, and the eating is forced, an involuntary contraction of the abdominal muscles and diaphragm takes place, and the contents of the esophagus, food usually mixed with a large quantity of mucus, flows out of the esophagus, without the expulsive effort that is usually associated with vomiting. Nausea is usually absent; although nausea and vomiting may be excited by the act of regurgitation. The patient is nearly always able to distinguish between regurgitation and vomiting, if his attention is called to the difference between the two acts. Pain, cramp-

like or dull in character, may be a prominent feature. Pain, however, is not invariably present. I feel justified in mentioning the apparently trifling details of the symptomatology of esophageal discomfort and regurgitation, because experience shows that grave error in diagnosis is constantly made. Esophageal disorders are mistaken for gastric disease; even gastro-enterostomy has been needlessly performed, when more careful attention to symptomatology combined with the observation of the patient while eating would have clearly shown that the disorder was located in the esophagus.

If the history and observation of the patient while eating make it probable that stenosis of the esophagus is present, a stomach-tube or bougie may be used to locate the obstruction. First, however, the patient should be carefully examined, to determine whether contraindications are present to the passage of such instruments. Aneurysm should be carefully excluded. High grade arterio-sclerosis, history of previous cerebral hemorrhage, heart incompetency, and other conditions may render the procedure unsafe. It is usually best to attempt to pass a soft stomach-tube first. The exact seat and degree of obstruction are, however, more accurately determined by a flexible bougie with graduated olive tips.

It is generally easy to diagnose and locate the seat of esophageal stenosis. To determine the nature of the obstruction is sometimes exceedingly difficult. In adults, carcinoma is by far the most common cause. This too often leads to serious error, since it is assumed upon insufficient evidence that esophageal stenosis is due to carcinoma. In a given case all other causes should be carefully considered before concluding that carcinoma is present.

The conditions that may lead to stenosis may be divided into extra- and intra-esophageal. Stenosis resulting from extra-esophageal cause is rare. Among such causes may be mentioned aneurysm, mediastinal tumors, spondylitis, pericardial effusion, esophageal diverticulum. Stenosis from intra-

esophageal conditions results from tumor, cicatrix, spasm, diverticulum, and foreign bodies.

Tumors of the esophagus may be benign, but are usually carcinomatous. Sarcoma may invade the esophagus from surrounding structures.

Carcinoma of the esophagus is characterized by the symptoms of stenosis, as described. The onset is usually gradual, although difficulty in swallowing solids may appear suddenly. As in organic stenosis from all causes, difficulty in swallowing solids usually appears first, liquids later.

The course is progressive, marked by slight variations in the difficulty in swallowing. Considerable improvement may be noted upon the administration of non-irritating liquid foods. A gain of several pounds in weight is possible for a time, by giving an abundance of milk and cream.

The location of the obstruction is of value in diagnosis. It is estimated that approximately fifty per cent. of all cases of esophageal carcinoma develop at the cardia, or immediately above, at the point where the esophagus passes through the diaphragm. About forty per cent. develop at or near the bifurcation of the trachea, and only about ten per cent. in the upper or cervical portion of the esophagus.

Metastatic growths are seldom of value in the early diagnosis of esophageal carcinoma, although they should be sought in the liver, cervical glands, lungs, pleura, and elsewhere. Since there is a tendency to early ulceration, a valuable diagnostic sign is the presence of blood in the stools, detected by the Weber test. Upon attempting to pass the stomach tube, odor characteristic of a sloughing mass often aids in diagnosis. The esophagoscope passed to the seat of the obstruction reveals either an ulcerating, bleeding, perhaps sloughing, mass, or nodular irregularities. Although a temporary gain in weight may be produced by appropriate feeding, the course of the disease is progressive. Emaciation and final cachexia supervene. After the first symptoms of difficulty in swallowing become manifest, the average duration of life is six or eight months.

Perforation into a bronchus is characterized by violent cough upon the ingestion of liquids. Broncho-pneumonia and death soon follow such a complication.

The blood changes of secondary anemia, such as are associated with carcinoma elsewhere, are of aid in differentiating benign from malignant stenosis.

Cicatrix.—Cicatrix causing esophageal stenosis is usually associated with a history of swallowing caustic acids or alkalis, although in some cases the incident is forgotten, and careful questioning is necessary to bring out such history. If the escharotic is strong, symptoms of stenosis begin at once. If mild, they may be delayed for several months. Cicatrix from peptic ulcer is an extremely rare cause of esophageal stenosis.

The history, course of the disease, and passage of bougies are usually sufficient for the diagnosis of cicatricial stenosis of the esophagus. If not, the esophagoscope may be used to advantage.

Diverticulum.—Diverticula of the esophagus are pouch-like sacculations of a portion of the circumference of the tube. Three forms based on etiology are recognized: Pressure diverticula, traction diverticula, and traction-pressure diverticula.

Traction diverticula are found frequently at autopsy, but seldom produce symptoms. The same may be said of traction-pressure diverticula. Pressure diverticula of the esophagus are relatively rare, but of much more serious import than the other forms. They usually develop at the upper end of the esophagus, or immediately above the left bronchus, or in the lower third of the esophagus. Clinically, the most important pressure-diverticulum is located at the upper end of the esophagus, and is known as Zenker's diverticulum. The origin of the sacculation is at a natural defect in the posterior wall of the esophagus, just below the pharyngo-esophageal orifice. Accumulation of food at this point may cause a pouch-like sacculation, which at first develops posteriorly, and later occupies a lateral position, usually to the left of the esophagus. As it develops, it projects downward along the course of the esoph-

agus. The capacity of the pouch varies from a few cubic centimetres to half a litre or more. In the early stages, slight discomfort such as dryness and irritation about the throat, is present. Later, the sensation of a foreign body may be noted, and, finally, difficulty in swallowing is experienced. As the sacculation increases, the accumulated food crowds the wall of the pouch against the esophagus, and obstructs its lumen. At such a stage difficult deglutition and regurgitation of food are present. In one-third of the cases a tumor is discoverable in the neck. It may be located behind or at one side; rarely on both sides, of the trachea. The patient often learns to empty the sac by making pressure upon it with the hand. A peculiar gurgling sound accompanies swallowing in many cases. *Fetor ex ore*, due to decomposition of food retained in the pouch, may be a prominent feature. It is often noted that swallowing is accomplished easier during the early part of the meal. As the sac fills, the esophagus is crowded upon, and its lumen obstructed. Upon attempting to pass a bougie it is usually arrested in the sac. If the bougie is slightly withdrawn, and the direction of its point changed, it may be passed into the esophagus. At times a large-sized bougie passes more readily than one with a small point. It frequently happens that a bougie may pass readily one day and not the next. Very little difficulty in swallowing may be present in cases in which it is impossible to pass a bougie. After swallowing liquids a small stomach tube may be passed to the seat of the obstruction, and the contents of the sac aspirated with an Ewald bulb. Secretions containing lactic acid and numerous micro-organisms may be obtained from the sac. Bismuth suspended in oatmeal gruel may be swallowed, and if sacculation is sufficient the X-ray will show the location and approximate size of the sac. The esophagoscope is rarely of much value in the diagnosis of diverticula.

Spasm.—Spasm of the esophagus may occur at any point in the tube. As a rule, contraction of the muscular fibres is not firm enough to produce obstruction, except when occur-

ring at the upper and lower ends of the esophagus. Stenosis from spasm of the upper end is usually slight, and will not be discussed further here.

Cardiospasm.—Spasm of the lower end of the esophagus, if long-continued, results in dilatation of the esophagus, and unless relieved, emaciation and finally death from starvation is likely to occur. Although not many cases are reported in the literature, the condition is not rare, and because of its seriousness the clinical picture should be more generally known. Normally, the cardiac end of the esophagus is closed by the contraction of its circular muscular fibres. During the act of swallowing, the circular fibres are automatically relaxed, and no hindrance is afforded to the passage of the contents of the esophagus into the stomach. If the automatic relaxing influence that occurs in swallowing is withdrawn, the closure of the cardiac orifice is firm enough to hold a column of water near the height of the esophagus. If the automatic force that should relax the cardia is impaired, or if a slight spasm of the cardia is present, food and drink accumulate in the esophagus, and if an attempt be made to eat or drink rapidly, regurgitation is likely to follow. If spasm is only slight, regurgitation may not occur, provided the patient eats or drinks slowly. Proportionate to the obstruction, the retention of food causes lateral pressure, which may be counteracted by an increase in the strength of the esophageal peristalsis. The tendency, however, is toward dilatation of the esophagus above the seat of obstruction. Following ordinary physiological laws, the muscular fibres of the esophagus hypertrophy, in their attempt to force the contents of the esophagus through the orifice narrowed by spasm. In most cases the spasm is so moderate that for several months and even years the increased strength of the esophageal peristalsis overcomes the obstruction sufficiently to prevent great loss in weight.

The continued overfilling of the esophagus caused by the spasm of the cardia leads to a fusiform dilatation of the organ. The retained food is likely to decompose, and cause irritation.

Thus inflammation and even ulceration of the mucous membrane of the dilated tube may arise. This is likely to be followed by reflex spasm of the cardia, and an increase in the obstruction. The capacity of the normal esophagus is about 100 c.c. The capacity of a dilated esophagus, caused by cardiospasm, varies from 150 to 1800 c.c. No doubt the extent of the dilatation is governed largely by the rapidity with which obstruction develops. If the retention of food is moderate, hypertrophy of the esophageal wall may keep pace and prevent undue dilatation. If retention is great before hypertrophy has had time to develop, the fusiform dilatation is likely to be proportionately large. In most cases the capacity of the dilated esophagus does not exceed five hundred c.c. The muscular spasm is on a nervous basis, hence the condition is likely to be found in nervous individuals. It has developed after profound emotional disturbances, such as fright, grief, and worry. In one case reported the difficulty in swallowing followed the suppression of menstruation. The patient feared she was pregnant. A blow on the sternum was the exciting cause of another case. The condition had developed during the course of acute infectious diseases, such as pneumonia and scarlet fever. A congenital case has been described.

The diagnosis of cardiospasm should not be difficult. The usual symptoms of stenosis at the lower end of the esophagus are present, with modifications peculiar to cardiospasm. The onset of the difficulty in swallowing may be sudden, or gradual. Mild grades of obstruction simply cause the patient to eat slowly. A sensation of fulness in the esophagus, and a feeling that the food and drink are arrested before they reach the stomach, is usually experienced. At first liquids are often swallowed with greater difficulty than solids. Before the esophagus is dilated, solids may be grasped by the peristalsis and forced through the cardia, while liquids more readily escape upwards. After dilatation occurs, obstruction is present alike to solids and liquids. Normally, immediately after swallowing food or drink, nothing can be aspirated from the

esophagus. When cardiospasm is present, several c.c. of liquid containing food particles and mucus may be regained from the esophagus even hours after the ingestion of food and drink. In the case under my own observation, 500 c.c. of water could be aspirated from the esophagus several minutes after it had been swallowed. The stenosis was so impervious to liquids that an ounce of olive oil given at night was recovered from the esophagus the next morning, practically without the loss of a drop, and yet, the lower end of the esophagus presented no anatomical narrowing. A very striking and diagnostic feature is that there may be little or no obstruction to the passage of the tube or bougie, even in cases in which a large quantity of liquid is retained in the esophagus. A very moderate spasm of the cardia may not be overcome by the peristaltic force of the most powerful hypertrophy of the muscular fibres above the seat of obstruction. As soon as the point of least resistance is above, regurgitation of food occurs. Normally, the thickness of the esophageal muscle varies from a half to two millimetres. In the case mentioned the hypertrophied muscle fibres were nine millimetres in thickness. No doubt several years were required for the development of such a hypertrophy. In the average case a bougie is arrested for a moment at the cardia, and then upon making slight pressure it passes through into the stomach. A large-sized bougie often passes as readily as one of smaller calibre. The difficulty in swallowing usually fluctuates more than it does when stenosis is due to organic disease. Excitement, overwork and worry are likely to increase the spasm. The patient may awake at night to find the pillow flooded with the contents of the esophagus. The horizontal position favors regurgitation. In organic stricture the retention of food and secretion in the esophagus is moderate compared to that which may be retained as a result of cardiospasm. X-ray pictures of the dilated esophagus may be obtained by causing the patient to swallow a five-per-cent. suspension of bismuth subnitrate in oatmeal gruel, until the "choking-up" sensation just short of regurgitation is developed. The esophagoscope

shows the cardia closed. The mucous membrane above the seat of constriction is reddened, and in some cases erosion and ulceration are present. Redundant folds of mucous membrane may be visible at the seat of the dilatation. Diverticulum causing obstruction at this point is so rare that there is seldom difficulty in differentiating the condition from cardiospasm. Rumpel's differential test consists in passing into the stomach a stomach-tube with many lateral perforations in its lower half; another tube without lateral perforations is passed into the diverticulum. Water is now introduced through the tube that is supposed to rest in the diverticulum. The diverticulum fills, and the excess passes into the stomach through the perforations in the tube that is introduced into the stomach. The quantity held by the diverticulum may now be withdrawn by using an Ewald aspirating bulb. If a fusiform dilatation is present, no water is regained because it will be lost by passing into the stomach through the perforations in the stomach tube. The successful issue of this test presupposes the ability to pass the perforated tube into the stomach, and the other into the diverticulum. If the results of the test are negative, diverticulum could not be thereby excluded. Modifications of this test of some merit have been made by Jung, Kelling, Krauss, Buckelmann, and others.

After dilatation of the esophagus occurs, unless the spasm is overcome, symptoms are likely to persist. As a rule, emaciation does not occur rapidly at first. The nutrition of the patient may not be greatly reduced for years. He learns to eat slowly and to help force the food down by taking a swallow of water, often combined with a deep breath. Other aids to swallowing are adopted, such as throwing the arms and shoulders backward, imitating the motion of the sea-gull in swallowing a fish. The motions used in rowing have also been used to aid in forcing the food into the stomach. Experience shows, however, that sooner or later the difficulty in swallowing increases. Regurgitation of food occurs more regularly and persistently. Emaciation develops, and starvation is the result, unless the spasm is over-

come or gastrostomy performed. Early diagnosis and relief of the condition are important, since after dilatation develops and becomes fixed and hypertrophied, the tube will always show some sacculation, and predispose to the accumulation of food, which is likely to excite reflex spasm of the cardia, and cause a return of the difficulty.

The best treatment of the condition—forcible dilatation of the cardia—does not come within the province of these remarks.